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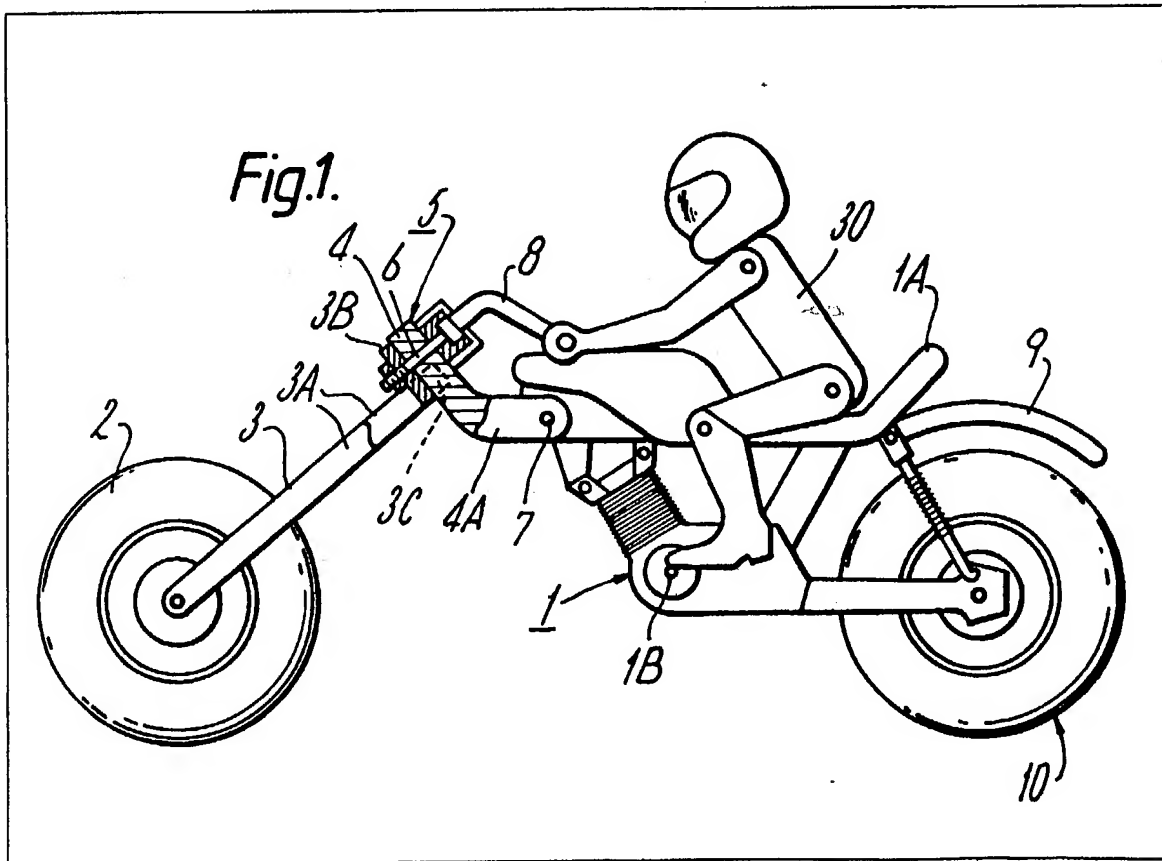
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**(54) Improvements in or relating to toy vehicles**

(57) A toy motorcycle comprises a body (1), a rear wheel (10) rotatably mounted on the body (1) and a front wheel unit (5) which is connected to a front portion of the body (1) by means of a mounting pin (7) which extends transversely of the longitudinal axis of the toy motorcycle. The front wheel unit (5) can be pivoted about the mounting

pin (7) so as to vary the orientation of the front wheel unit (5) with respect to the body (1) and comprises a holding plate (4), a front fork (3) which is rotatably mounted on the holding plate (4) and a front wheel (2) which is rotatably mounted on the front fork (3). A flywheel or spring motor is provided in the rear wheel (10).



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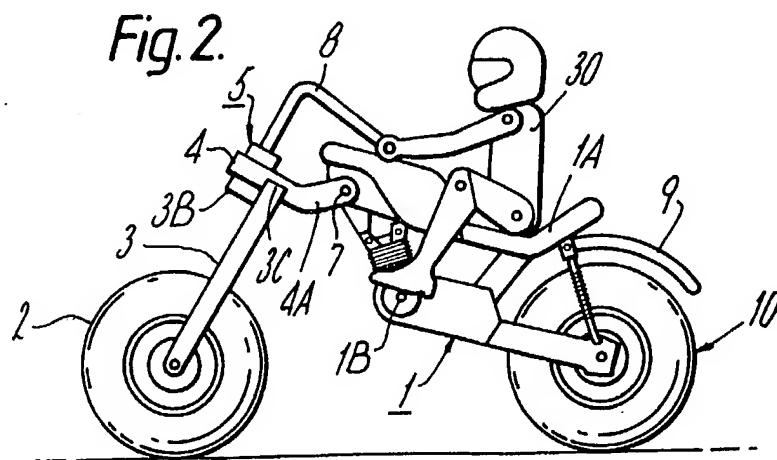


Fig.3.

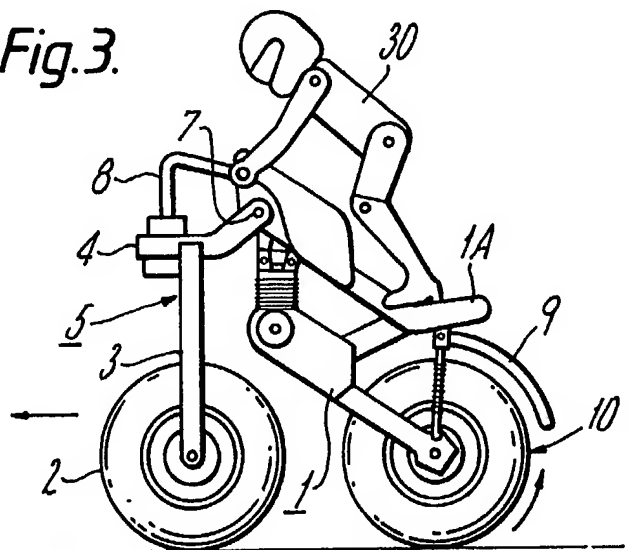
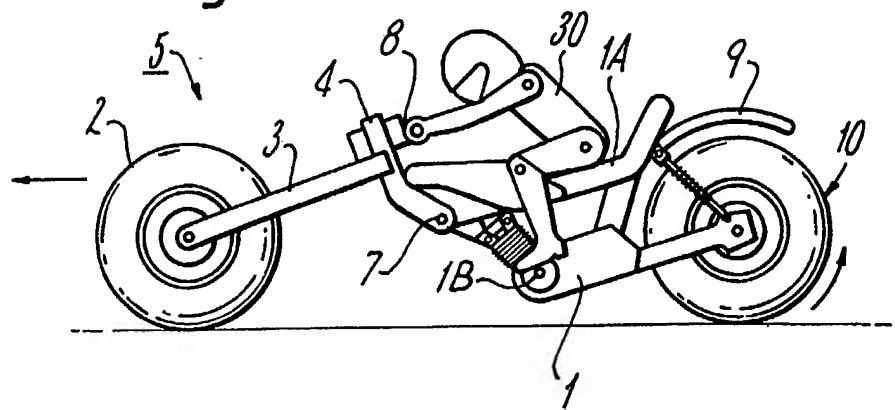


Fig.4.



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Fig. 5.

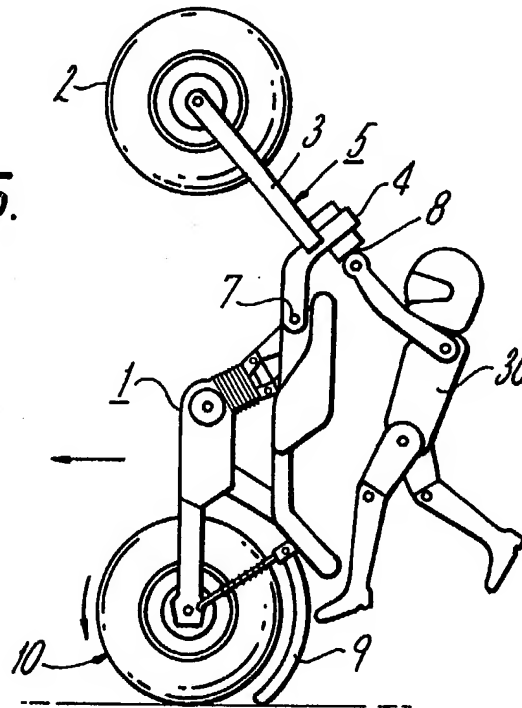
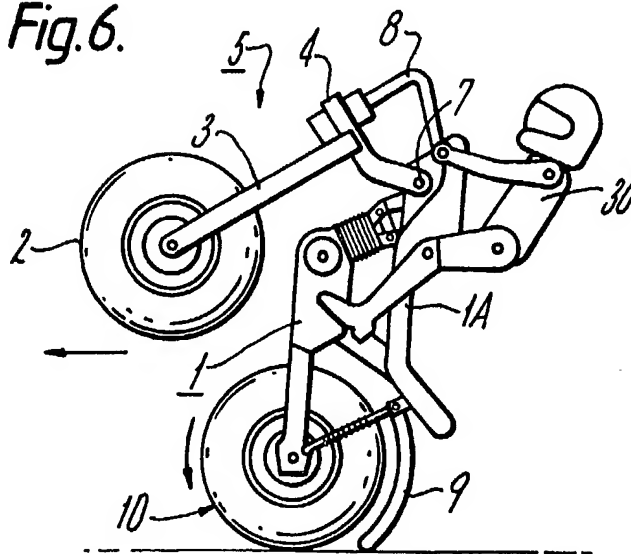


Fig. 6.



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Fig. 7.

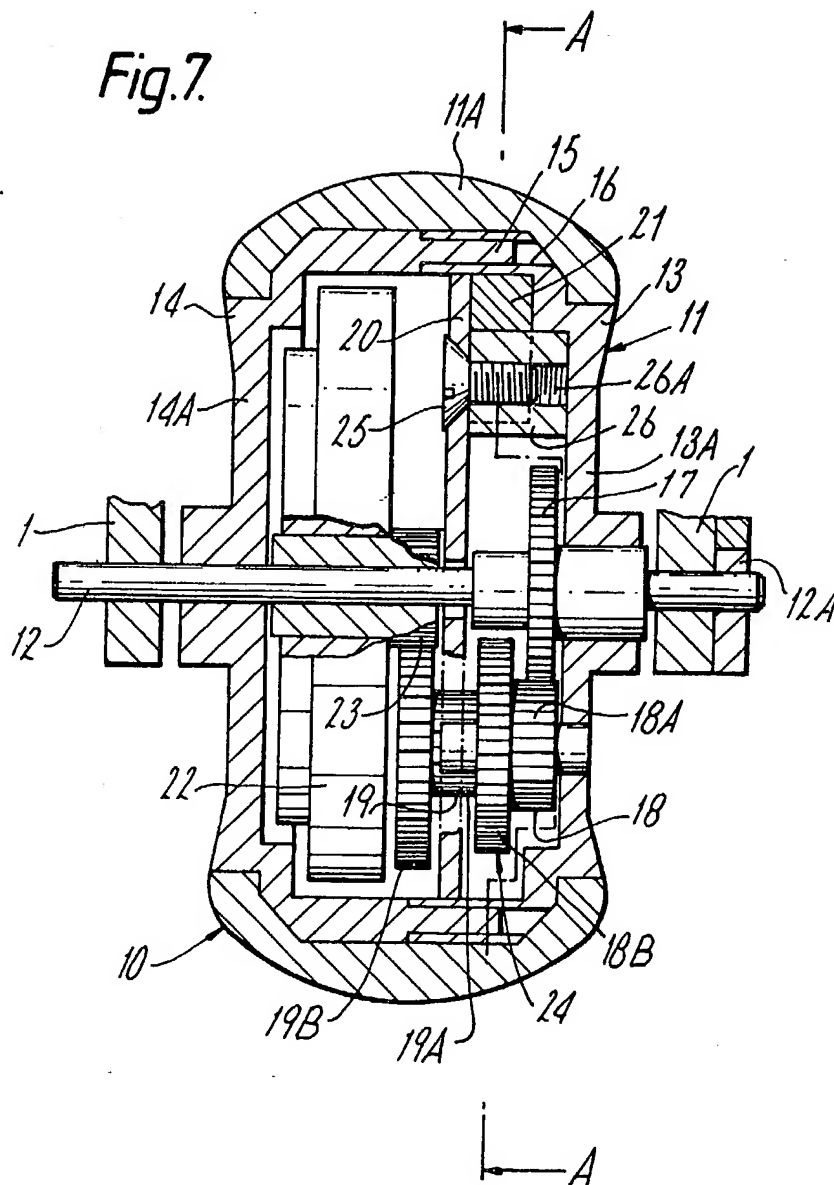
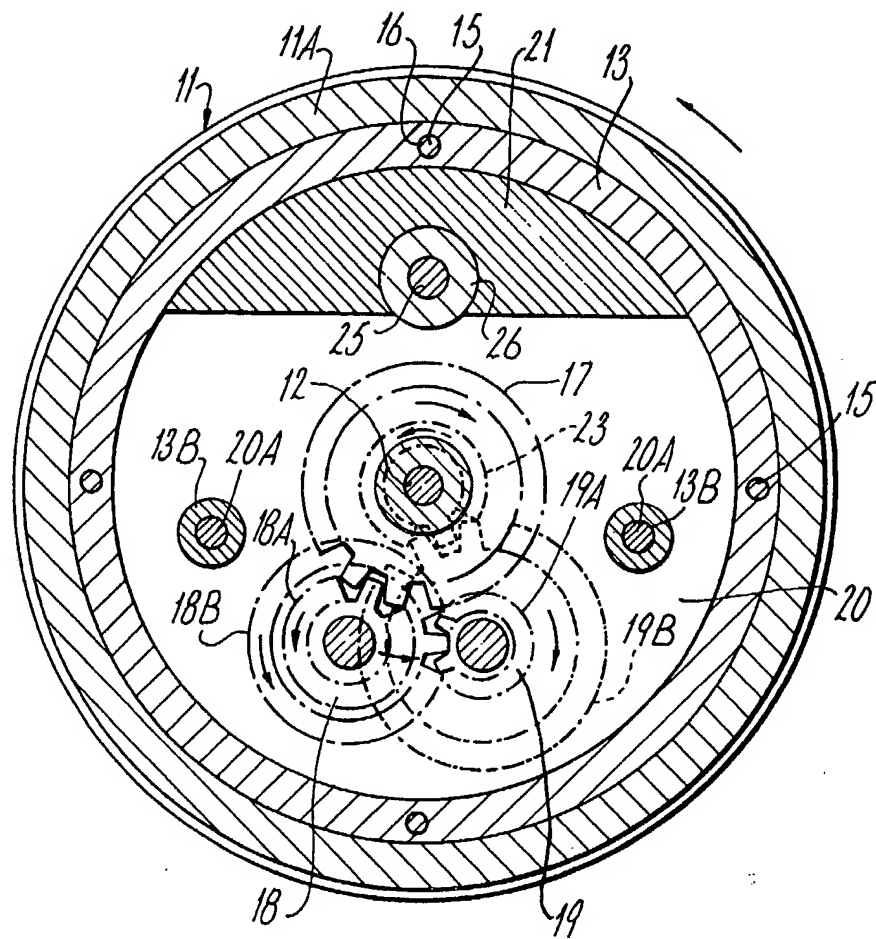


Fig. 8.



## SPECIFICATION

### Improvements in or relating to toy vehicles

- 5 THIS INVENTION relates to improvements in or relating to toy vehicles, such as toy motorcycles.

Toy motorcycles have been proposed which comprise a power source such as a spring or a flywheel. However, many toy motorcycles have failed to capture interest because they are too simple in operation.

It is an object of the present invention to enable the provision of a toy vehicle, such as a toy motorcycle, whereby the above disadvantage may be overcome or at least mitigated.

Accordingly, the present invention provides a toy vehicle, which comprises two components, which are normally intended to contact a surface supporting the vehicle, first and second portions, the relative orientation of the first portion being adjustable with respect to the second portion so as to alter the distance between the said two components, and means for enabling a selected relative orientation of the first and second portions to be retained.

Preferably, the toy vehicle comprises a toy motorcycle in which a front wheel unit is mounted to a body with a selectable mounting angle.

Advantageously, one or each of the components comprises an anti-friction member such as a skid or runner or a rotatable member such as a wheel, roller or bearing.

The present invention thus enables the provision of a novel and interesting toy vehicle.

For a better understanding of the present invention, and to show how the same may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

*Figures 1 to 6* inclusive are side elevational views of a toy motorcycle in accordance with the present invention in respective different positions;

*Figure 7* is a sectional view of a wheel of the toy motorcycle of *Figs. 1 to 6*; and

*Figure 8* is a sectional view taken along the line A-A of *Fig. 7*.

Referring now to the drawings, a toy motorcycle comprises a body 1 formed of, for example, plastics material and resembling in shape a real motorcycle, with a fuel tank, an engine, a seat, suspension and so on. The body 1 is provided with a rear, driving, wheel 10 which contains a driving mechanism comprising a flywheel 22. A front fork 3 carrying a front wheel 2 is rotatably mounted to a holding plate 4 provided at the front of the body 1. The front fork 3 comprises a fork body 3A and an upper plate 3B. The front wheel 2 is provided with a rubber tyre and is journaled to the fork body 3A, whilst the upper plate 3B of the front fork 3 is rotatably

mounted to the holding plate 4 by means of a shaft 6. The upper end of the fork body 3A extends beyond the upper plate 3B to define left and right lugs 3C which by contacting the left and right sides of the holding plate 4 limit rotation of the front fork 3 to the right and left. Also, a handle 8 is fixed to the shaft 6 for effecting rotation thereof relative to the holding plate 4. The handle 8 may for example, be T-shaped or V-shaped. The front fork 3, the front wheel 2, the holding plate 4, the shaft 6 and the handle 8 constitute a front wheel unit 5 which is connected to the body 1 by means of a mounting pin 7 which

extends transversely of the longitudinal axis of the toy motorcycle through a rear portion 4A of the holding plate 4 and through a front portion of the body 1. The front wheel unit 5 can be pivotally moved to select a desired position thereof with respect to the body 1 in a vertical plane, and then retains the selected position. Alternatively, the front wheel unit 5 may be mounted to the body 1 by means of, for example, a screw which can be loosened temporarily to adjust the position of the front wheel unit 5.

As shown in *Figs. 7 and 8*, the driving wheel 10 comprises an axle 12 which is fixed to the toy body 1 by means of a stopper 12A and on which a hollow wheel body 11 is rotatably mounted. Within the wheel body 11 a flywheel 22 is rotatably mounted on the axle 12 and an accelerating gear chain 24 is provided for transmitting rotation the wheel body 11 to the flywheel 22. The wheel body 11 is disc-shaped and comprises two disc-shaped members 13 and 14 defining side walls 13A and 14A respectively. The members 13 and 14 are provided at their peripheries with pegs 15 and holes 16 for receiving the pegs 15, respectively, whereby the wheel body 11 can be assembled and disassembled and the members 13 and 14 are firmly secured together in the assembled wheel. The wheel body 11 is provided at its periphery with an annular tyre 11A formed of rubber and/or plastics material or the like which is fixed, for example adhered, to the wheel body 11. A sun gear 17 is mounted on the axle 12 within the wheel body 11 and immediately adjacent one of the side walls 13A. A planetary gear 18 is journaled to the same side wall 13A and meshes with the sun gear 17. The planetary gear 18 comprises a driving wheel 18A and a driven wheel 18B, having more teeth than the driving wheel 18A, which are integrally formed and the sun gear 17 meshes with the driving wheel 18A of the planetary gear 18. Also, an intermediate gear 19 is journaled to the side wall 13A and meshes with the planetary gear 18. The intermediate gear 19 comprises a driving wheel 19A and a driven wheel 19B, having more teeth than the driving wheel 19A, which are formed integrally and the driven wheel 18B of

the planetary gear meshes with the driving wheel 19A of the intermediate gear 19.

5 A partition 20 is provided in the wheel body 11 to support the planetary gear 19 and the intermediate gear 19 and between the partition 20 and the side wall 13A there is provided a balancing weight 21 to balance the weight of the wheel body 11 when the planetary gear 18 and the intermediate gear 10 19 are disposed therein. The balancing weight 21 is positioned opposite the mid-portion between the planetary gear 18 and the intermediate gear 19 to facilitate smooth rotation of the wheel body 11. On the other side of the partition 20 from the sun gear 17, the planetary gear 18 and the intermediate gear 19, a flywheel 22 is rotatably mounted on the axle 12. A flywheel driving gear 23 is coaxially and integrally fixed to the flywheel 22 and meshes with the driven wheel 19B of the intermediate gear 19. Thus, the wheel body 11 contains an accelerating gear chain 24 comprising the sun gear 17, the planetary gear 18, the intermediate gear 19 and the flywheel driving gear 23, which gear chain transmits rotation of the wheel body 11 to the flywheel 22 and vice-versa.

20 A fixing screw 25 secures the partition 20 to the side wall member 13 and the screw 25 is threaded into a hole 26A which is provided in a projection 26 integrally formed with or fixed to the side wall 13A. Also, the partition 20 is provided with a projection 20A for facilitating mounting the partition to the side wall 13A and the projection 20A is received in an opening 13B provided in the side wall 13A.

Although not shown, the accelerating gear chain 24 may comprise an internal gear on an inner circumference of the wheel body and a planetary gear meshing with the internal gear and borne by an arm fixed to the wheel, while the flywheel having the driving gear is rotatably mounted on the axle and the driving gear coacts with the planetary gear. Between the planetary gear and the driving gear of the accelerating gear chain thus formed a plurality of intermediate gears is provided and supported by the partition so that the wheel body and the flywheel turn in the same direction. Such an accelerating gear chain comprising an internal gear on the inner circumference of the wheel body 1 may have a simple structure but produce a relatively large acceleration ratio.

55 A model rider 30 is mounted to the handle 8, a seat 1A, a step 1B or the like, and comprises arms and legs which are pivoted to the body thereof.

60 In use of the toy motorcycle, the mounting angle of the front wheel unit 5 to the toy body 1 may be changed to provide toy motorcycles of various types. For example, a conventional motorcycle may be provided as shown in Fig. 1. By narrowing the distance

between the front wheel 2 and the rear wheel 10 a toy motorcycle of the American type may be provided as shown in Fig. 2. Also, a tall motorcycle may be provided as shown in Fig. 3. By enlarging the distance between the front wheel 2 and the rear wheel 10 more than that in the conventional motorcycle, a drag racer may be provided as shown in Fig. 4.

75 In order to propel the toy motorcycle forwards, the rear wheel 10 is set in rotation, for example by moving the toy motorcycle along a flat surface or using a hand, so that the flywheel 22 is set in motion to accumulate kinetic energy. When the toy motorcycle is then placed on a flat surface, the accumulated kinetic energy in the flywheel 22 enables the toy motorcycle to carry on travelling.

80 As can be seen in Figs. 5 and 6, the toy motorcycle can be made to travel only on the rear wheel 10, the front wheel 2 being raised from the surface on which the toy motorcycle is placed. A rear wheel mudguard 9 balances the toy motorcycle by contacting the surface immediately behind the rear wheel 10.

Thus, the toy motorcycle comprises the body 1, the rear wheel 10 having a driving mechanism and the front wheel unit 5 in which the fork 3 rotatably supports the front wheel 2, wherein the front wheel unit 5 is mounted to the front portion of the body 1 by means of the mounting pin 7 which extends transversely of the longitudinal axis of the body 1. Thus, toy motorcycles of various types may be readily provided, as hereinbefore described. The angle of the front wheel unit 5 to the body 1 is variable, so that the angle of the shaft 6, which mounts the front fork 3 of the front wheel unit 5 rotatably to the holding plate 4, from the vertical may be changed as desired. Accordingly, the way in which the toy travels may be finely adjusted. For example, in the tall toy motorcycle shown in Fig. 3, the stability is low so that a staggered or weaving travelling motion is obtained, whereas in the toy motorcycles of the traditional or drag racer types the stability is enhanced so that the motorcycles travel in a straight line but with various changes in the travelling actions.

115 In addition, the rear wheel 10 having the driving mechanism comprises the axle 12 fixed to the body 1 and the hollow wheel body 11 rotatably mounted on the axle 12, wherein the flywheel 22 is rotatably mounted on the axle 12 within the wheel body 11 and the accelerating gear chain 24 is provided for transmitting rotation of the flywheel 22 to the wheel body 11 and vice versa. Thus, a toy motorcycle having the driving mechanism may be readily made by mounting the rear wheel 10 to the body 1. Also, a flywheel 22 of relatively heavy weight may be provided in the rear wheel 10, so that the centre of gravity of the toy motorcycle is positioned in



the vicinity of the rear wheel 10, thereby facilitating a relatively smooth and stable "wheelie" operation. Of course, the driving mechanism could be disposed in the body 1 and could comprise spring means or the like instead of the flywheel 22. Thus, using the toy motorcycle described above, toy motorcycles of various types may be easily made and used in a variety of different ways.

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#### CLAIMS

1. A toy vehicle, which comprises two components, which are normally intended to contact a surface supporting the vehicle, first and second portions, the relative orientation of the first portion being adjustable with respect to the second portion so as to alter the distance between the said two components, and means for enabling a selected relative orientation of the first and second portions to be retained.

2. A toy vehicle according to Claim 1, wherein one or each of the said two components comprises a wheel.

3. A toy vehicle according to Claim 2, which is a toy motorcycle.

4. A toy vehicle according to any one of the preceding claims, wherein the retaining means comprises a mounting pin.

5. A toy vehicle according to any one of Claims 1 to 3, wherein the retaining means comprises a screw.

6. A toy vehicle according to any one of the preceding claims, which has a wheel comprising a rotatable wheel body and further means forming part of the wheel for storing energy imparted to the wheel by rotation of the wheel body.

7. A toy vehicle according to any one of the preceding claims, wherein one or each of the said two components is mounted on a respective one of the first and second portions.

8. A toy motorcycle, which comprises a body, a rear wheel, means associated with the rear wheel for driving the rear wheel, a front wheel unit, a front fork rotatably mounted in the front wheel unit and a front wheel rotatably mounted in the front fork, wherein the front wheel is mounted to a front portion of the body by means of a mounting pin which extends transversely of the longitudinal axis of the toy motorcycle, whereby the orientation of the front wheel unit with respect to the body can be adjusted.

9. A toy motor cycle according to Claim 8, wherein the rear wheel comprises an axle which is fixed to the body, a hollow wheel body rotatably mounted on the axle, a flywheel rotatably mounted on the axle within the wheel body and an accelerating gear chain for transmitting rotation of the wheel body to the flywheel.

10. A toy motorcycle, substantially as hereinbefore described with reference to and

as shown in, the accompanying drawings.

11. Any novel feature or combination of features described herein.

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